GENERAL INFORMATION AND FORMAT

FOR SUBMISSION OF PROJECT PROPOSALS FOR FINANCIAL ASSISTANCE

For

ADVANCED HYDROGEN AND FUEL CELL PROGRAMME

Under

(TECHNOLOGY MISSION DIVISION- Energy, Water & Others)

Focuses on R &D, D of hydrogen and fuel cell technologies across multiple sectors enabling innovation, a strong domestic economy, and a clean, equitable energy future.

Last Date of Submission: 15th August, 2021

सत्यमेव जयते

GOVERNMENT OF INDIA
MINISTRY OF SCIENCE & TECHNOLOGY
DEPARTMENT OF SCIENCE & TECHNOLOGY
TECHNOLOGY BHAVAN, NEW MEHRAULI ROAD
NEW DELHI – 110 016

GENERAL INFORMATION

The Department of Science & Technology (DST) under its Advanced Hydrogen and Fuel cell Programme is promoting and supporting activities related to indigenous development of new and existing material in large quantities, catalysts, membrane, components for fuel cells, electrolysers, hydrogen storage materials, materials for type IV cylinders and prototypes for implementation of various applications of hydrogen and fuel cell in the country.

The objective is to address the several other challenges in the entire hydrogen pathway like:

- Low cost green hydrogen production at a reasonable scale for wide-range and utilization in India to enable resiliency of the power generation and transportation sectors, while also aligning domestic industries, domestic competitiveness and job creation.
- Approaches include hydrogen production from water splitting, such as electrolysis, photo-electrochemical cells, or solar thermochemical systems. The primary uses of hydrogen today are in the oil refining and ammonia industries. Other emerging applications include fuel cell vehicles, metals refining, and synthetic natural gas production.
- Infrastructure requirements for hydrogen to be delivered to the point of end-use, like dispenser at a refuelling station or stationary power site. Infrastructure includes the pipelines, trucks, storage facilities, compressors, and dispensers involved in the process of delivering fuel. The infrastructure needs to be sufficient to support widespread consumer use of hydrogen as an energy carrier. Key challenges to hydrogen delivery include reducing delivery cost, increasing energy efficiency, maintaining hydrogen purity, and minimizing hydrogen leakage.
- Hydrogen storage is a key enabling technology for the advancement of hydrogen and fuel cell technologies in applications including stationary power, portable power, and transportation. Development of advanced storage methods that have potential for higher energy density.
- Catalyst poisoning in case of catalytic conversion for large scale hydrogen production.
- Use of less expensive catalysts in case of green hydrogen production processes and for fuel cells.
- Cost and energy penalty in hydrogen transport and the required infrastructure.
- Cost of catalyst, membrane and components of fuel cell.
- Blending and utilization of hydrogen with carbonaceous fuels to achieve reduction in emissions in medium term.
- Decarbonisation of hard to abate sectors in longer term with the use of hydrogen.

IDENTIFIED AREAS:

Following areas have been identified and project proposals may be submitted for research development and demonstration needs for hydrogen and fuel cells: -

- Development of improved electrolysers at MW scale and their integration with renewables to demonstrate green hydrogen generation.
- Demonstration of large scale, sustainable and cost-effective bio hydrogen production
- High-density solid-state hydrogen storage material-based technologies for various applications including heating and cooling, thermal energy storage, compression, back- up power etc.
- Demonstration of large-scale grid storage for integration of renewables.
- Demonstration of liquid organic hydrides-based hydrogen transport including the synthesis and regeneration of LOHC.
- Demonstration of suitability of novel materials including adsorbents based complex and chemical hydrides and their scalability for large scale hydrogen storage.
- Improving the efficiency of the conversion processes.
- Development of cost-effective carbon capture use and storage (CCUS) for reforming processes.
- Material processing and new material development for hydrogen production through water electrolysis (Alkaline/acid/SOEC), photo-electrolysis, photo-catalysis etc.
- Low cost separation and purification technologies for thermal production processes.
- Increasing durability and lowering cost of fuel cells, alternatives to Proton Exchange membranes (Surface area and activity loss due to catalyst dissolution, Catalyst particle growth and agglomeration, Activity loss due to catalyst support corrosion, Degradation due to corrosion of the bipolar plates, Voltage loss due to increasing contact resistance between individual components , Membrane degradation due to chemical attack and mechanical stress, Catalyst and membrane performance loss due to contamination)
- Enable development of manufacturing technologies and processes of hydrogen and fuel cell components in parallel with technology development while fostering a strong domestic supplier base. Develop manufacturing techniques to reduce the cost of fuel cell stacks at high volume
- Reduce the cost of manufacturing components and systems to produce and deliver hydrogen
- Demonstration of cost effective and compact indigenous electrochemical stack (Fuel cells) of capacity 100kW or more with Protocols for testing PEMFC components and stack
- Integration of Green hydrogen storage systems with fuel cells at a suitable level for power generation
- High efficient power converters for all applications related to RE (PV/wind), electrolyser and fuel cells

- Fabrication of indigenous Type IV tanks.
- Development of materials for lightweight hydrogen cylinder – Includes development of lightweight composite materials for hydrogen storage which can resist embrittlement and flames.
- Detailed studies on the requirements, technical barriers and economics for the introduction of hydrogen to the hard to abate sectors.
- Development of policy frameworks and standards for deployment of hydrogen based technologies.
- Demonstration of projects including the complete hydrogen pathways from production, storage, transport, utilization and refueling at a larger scale for e.g. around hundreds of kg of H_2 with state of art technologies.

WHO CAN SUBMIT PROJECT PROPOSALS

The Project Proposal could be submitted for financial support though **ONLINE MODE ONLY** by Scientists/ Engineers/ Technologists working in Universities and other Academic institutions; R&D institutions/ laboratories having adequate infrastructure and facilities to carry out R&D work. The PI(s) should have relevant experience as evident from previous prototype commercialization or development or practical experience in the chosen area/topic with field knowledge.

Financial support will be provided only for temporary staff salaries, equipment, consumables, domestic travel and other miscellaneous items. No support will be provided towards basic infrastructure, buildings and International travel. The investigators/ R&D Group should have adequate experience and expertise in the relevant area of proposal. Proposals submitted along with relevant Industry-partner will be given preference. It may be noted that underlining importance of ***Atmanirbhar Bharat*** for all round growth and development of nation, objective of this call is to support activities related to indigenous development of new material, catalyst, membrane, components of fuel cell and prototypes for implementation of various applications of hydrogen and fuel cell in the country. The project leading to develop a device/prototype with **Technology Readiness Levels** (**TRL**) and having potential for commercialization will be preferred for financial support. Basic R&D proposal leading to only research publications will not be supported under this call. The commercialization plan should be clearly spelled out with achievable milestones, timelines, justifiable budget requirement and engagement with prospective technology transfer partners or technology transfer facilitating bodies.

PIs whose proposal have been recommended/ awarded for grant from DST under HFC 2018 programme are NOT ELIGIBLE to apply in this call.

PROCEDURE FOR SUBMISSION OF PROJECT PROPOSALS

The Project Proposal could be submitted in the enclosed format through **ONLINE MODE ONLY (www.onlinedst.gov.in).NO HARD COPY** of the project proposal should be submitted.

Please ensure that following documents have been completed and uploaded along with the proposal.

i. Certificate from the investigator (in the enclosed format);and

ii. Endorsement from Head of the institution on Letter Head (in the enclosed format).

iii. A signed certificate for the Conflict of Interest (in the enclosed format).

iv. Bio data of PI/Co-PI

Application received without above documents with incomplete information will not be entertained. **Soft copy in pdf format is also to be emailed to ranjith.krishnapai@gov.in on or before 15th August, 2021 (05:30pm).**

Contacts: Any enquiries related to this call should be directed to:

Dr. Ranjith Krishna Pai
Director/Scientist 'E'
Technology Mission Division (Energy & Water)
S&T Block 3, Room No: 01
Department of Science and Technology (DST)
Ministry of Science and Technology, Govt. of India
Technology Bhavan, New Mehrauli Road
New Delhi-110016
Ph: 011-26590475
E-mail: ranjith.krishnapai@gov.in

POINTS TO BE KEPT IN MIND WHILE SUBMITTING PROJECT PROPOSALS

1. **Involvement of industries**

   It is envisaged that the end product of development shall be transferred to industries for commercial production. Hence, it is desirable that industry (ies) may be associated with project right from the beginning with defined participation in technical terms.

   As far as possible the proposed prototype/device should have sufficient users in the country and there should be adequate demand for the product.

2. **Project Duration:**

   The projects should be time-bound normally for duration of 2-3 years depending upon the prototype/device to be developed.

3. **Funding Available:** 10 Crore maximum

4. **Monitoring of the Project:**

Implementation of the projects will be monitored regularly through Progress Reports, Financial Statements and Committee of Experts in Group review meetings and onsite as well. DST approved committee may visit the organization periodically to review the progress of the work being carried out and suggest suitable measures to ensure realization of the objectives of the project.

5. Fund support under non -recurring grant for required equipment's will be given only if the same facility is not available in the PI' institution or nearby institutions. The laboratories and institutions should be well-equipped and preferably have all the essential equipment and infrastructure for the prototype development. No major infrastructure will be funded.

GENERAL TERMS AND CONDITIONS FOR THE GRANT

1. Information regarding Proof of Concept and Early prototype should be provided in the project proposal.

2. The PI can submit only one proposal against this HFC 2021 Call. Submission of more than one proposal from a PI would liable to be disqualification of all the submitted proposal.

3. The Institution where project will be implemented, will assume financial and other administrative responsibilities of the project. No financial support will be provided to the industry.

4. In case of multi-institutional project, the Principal Investigator has to obtain formal agreement from the collaborating Institutions/Scientists.

5. International travel is normally not permissible under the project.

6. The manpower recruited for the project should be paid as per the rules of the institute and guidelines of the Government of India (**OM. No. SR/S9/Z-08/2018 dated 30.01.2019 and SR/S9/Z-05/2019 dated 21.08.2019)**. The posts which are not covered under the guidelines but permissible under projects at host institute are also permitted.

The temporary staff employed for the project by the organization is not treated as employees of Government of India and the deployment of such staff at the time of termination of the project will not be the concern / responsibility of the Government of India.

7. It is the policy of DST to maximize the use of equipment. In this light, investigator shall permit the use of spare or idle capacities of equipment procured under the project by bona fide users (research workers in other DST funded projects or other projects of the institute).

8. All the assets including equipment acquired and prototypes fabricated from the grant will be the property of Government of India and should not be disposed of, or utilized for purposes other than those for which the grant has been sanctioned, without the prior sanction of the Department of Science &Technology.

9. The Principal Investigator/ Organization will be required to furnish progress report every six months on the progress made on all aspects of the project including expenditure incurred on various approved items during the period.

10. The Comptroller and Auditor General will have the right to access to the books and accounts of the organization for Grants received from the Government.

11. The organization would maintain separate account for the project. The grant should be kept in an interest earning bank account and the interest earned should be reported to the Department of Science & Technology. The grantee organization will have to enter & upload the Utilization Certificate in the PFMS portal besides sending it in physical form to this Division. The subsequent/final installment will be released only after confirmation of the acceptance of the UC by the Division and entry of previous Utilization Certificate in the PFMS.

12. The grantee organization will maintain separate audited account for the project and the entire amount of grant will be kept in an interest bearing bank account. For Grants released during F.Y. 2017-18 and onwards, all interests and other earnings against released Grant shall be remitted to Consolidated Fund of India (through Non-Tax Receipt Portal (NTRP), i.e. www.bharatkosh.gov.in), immediately after finalization of accounts, as it shall not be adjusted towards future release of Grant. A certificate to this effect shall have to be submitted along with Statement of Expenditure/ Utilization Certificate for considering subsequent release of Grant/ Closure of Project accounts.

13. Grant can be terminated by DST at any stage if it is convinced that the Grant has not been properly utilized or appropriate progress is not being made.

14. If the Principal Investigator wishes to leave the organization where the project is based, the organization/investigator will inform the same to DST and with its consultation evolve steps to ensure successful completion of the project, before relieving the Principal Investigator. The Investigator should submit three copies of complete and detailed report of the work done by them on the project before leaving the organization.

15. Sale proceeds, if any, of the components, prototypes, pilot plants etc. fabricated as a result of the development of the project arising directly from funds granted by the Department of Science & Technology shall be remitted to the Government of India. The Government of India, may, at its discretion allow a portion of such receipt to be retained by the organization.

16. The know-how generated from the project would be the property of the Government of India and any receipts by way of sale of know-how, utilization of know-how for production, royalties etc. shall belong to the Government of India. The Government of India, may, at its discretion, allow a portion of such receipts to be retained by the organization.

17. The Principal Investigator / organization will prepare all the documents that would be required for the transfer of know-how to the production agency/agencies and submit them to DST as and when required. The organization will be responsible to transfer the know-how developed to the production agency/ agencies and supply all the needed information to the production agency/ agencies as and when required.

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DEPARTMENT OF SCIENCE AND TECHNOLOGY
(POLICY ON CONFLICT OF INTEREST)

FOR APPLICANT

Issues of Conflicts of Interest and ethics in scientific research and research management have assumed greater prominence, given the larger share of Government funding in the country's R&D scenario. The following policy pertaining to general aspects of Conflicts of Interest and code of ethics, are objective measures that is intended to protect the integrity of the decision making processes and minimize biasness. The policy aims to sustain transparency, increase accountability in funding mechanisms and provide assurance to the general public that processes followed in award of grants are fair and non-discriminatory. The Policy aims to avoid all forms of biasness by following a system that is fair, transparent and free from all influence/ unprejudiced dealings, prior to, during and subsequent to the currency of the programme to be entered into with a view to enable public to abstain from bribing or any corrupt practice in order to secure the award by providing assurance to them that their competitors will also refrain from bribing and other corrupt practice and the decision makers will commit to prevent corruption, in any form, by their officials by following transparent procedures. This will also ensure a global acceptance of the decision making process adopted by DST.

Definition of Conflict of Interest:

Conflict of Interest means "any interest which could significantly prejudice an individual's objectivity in the decision making process, thereby creating an unfair competitive advantage for the individual or to the organization which he/she represents". The Conflict of Interest also encompasses situations where an individual, in contravention to the accepted norms and ethics, could exploit his/her obligatory duties for personal benefits.

1. **Coverage of the Policy**:

a) The provisions of the policy shall be followed by persons applying for and receiving funding from DST, Reviewers of the proposal and Members of Expert Committees and Programme Advisory Committees. The provisions of the policy will also be applicable on all individuals including Officers of DST connected directly or indirectly or through intermediaries and Committees involved in evaluation of proposals and subsequent decision making process.

b) This policy aims to minimize aspects that may constitute actual Conflict of Interests, apparent Conflict of Interests and potential Conflict of Interests in the funding mechanisms that are presently being operated by DST. The policy also aims to cover, although not limited to, Conflict of interests that are Financial (gains from the outcomes of the proposal or award), Personal (association of relative / Family members) and Institutional (Colleagues, Collaborators, Employer, persons associated in a professional career of an individual such as Ph.D. supervisor etc.)

2. **Specifications as to what constitutes Conflict of Interest**.

Any of the following specifications (non-exhaustive list) imply Conflict of Interest if,

(i) Due to any reason by which the Reviewer/Committee Member cannot deliver fair and objective assessment of the proposal.

(ii) The applicant is a directly relative# or family member (including but not limited to spouse, child, sibling, parent) or personal friend of the individual involved in the decision making process or alternatively, if any relative of an Officer directly involved in any decision making process / has influenced interest/ stake in the applicant's form etc.

(iii) The applicant for the grant/award is an employee or employer of an individual

involved in the process as a Reviewer or Committee Member; or if the applicant to the grant/award has had an employer- employee relationship in the past three years with that individual.

(iv) The applicant to the grant/award belongs to the same Department as that of the Reviewer/Committee Member.

(v) The Reviewer/Committee Member is a Head of an Organization from where the applicant is employed.

(vi) The Reviewer /Committee Member is or was, associated in the professional career of the applicant (such as Ph.D. supervisor, Mentor, present Collaborator etc.)

(vii) The Reviewer/Committee Member is involved in the preparation of the research proposal submitted by the applicant.

(viii) The applicant has joint research publications with the Reviewer/Committee Member in the last three years.

(ix) The applicant/Reviewer/Committee Member, in contravention to the accepted norms and ethics followed in scientific research has a direct/indirect financial interest in the outcomes of the proposal.

(x) The Reviewer/Committee Member stands to gain personally should the submitted proposal be accepted or rejected.

(xi) The Term "Relative" for this purpose would be referred in section 6 of Companies Act, 1956.

3. Regulation:

The DST shall strive to avoid conflict of interest in its funding mechanisms to the maximum extent possible. Self-regulatory mode is however recommended for stake holders involved in scientific research and research management, on issues pertaining to Conflict of Interest and Scientific Ethics. Any disclosure pertaining to the same must be made voluntarily by the applicant/Reviewer/Committee Member.

4. Confidentiality:

The Reviewers and the Members of the Committee shall safeguard the confidentiality of all discussions and decisions taken during the process and shall refrain from discussing the same with any applicant or a third party, unless the Committee recommends otherwise and records for doing so.

5. Code of Conduct

5.1 To be followed by Reviewers/Committee Members:

(a) All reviewers shall submit a conflict of interest statement, declaring the presence or absence of any form of conflict of interest.

(b) The reviewers shall refrain from evaluating the proposals if the conflict of interest is established or if it is apparent.

(c) All discussions and decisions pertaining to conflict of interest shall be recorded in the minutes of the meeting.

(d) The Chairman of the Committee shall decide on all aspects pertaining to conflict of interests.

(e) The Chairman of the Committee shall request that all members disclose if they have any conflict of interest in the items of the agenda scheduled for discussion.

(f) The Committee Members shall refrain from participating in the decision making process and leave the room with respect to the specific item where the conflict of interest is established or is apparent.

(g) If the Chairman himself/herself has conflict of interest, the Committee may choose a Chairman from among the remaining members, and the decision shall be made in consultation with Member Secretary of the Committee.
(h) It is expected that a Committee member including the Chair-person will not seek funding from a Committee in which he/she is a member. If any member applies for grant, such proposals will be evaluated separately outside the Committee in which he/she is a member.

5.2 To be followed by the Applicant to the Grant/Award:

(a) The applicant must refrain from suggesting referees with potential Conflict of Interest that may arise due to the factors mentioned in the specifications described above in Point No.2.
(b) The applicant may mention the names of individuals to whom the submitted proposal should not be sent for refereeing, clearly indicating the reasons for the same.

5.3 To be followed by the Officers dealing with Programs in DST:

While it is mandatory for the program officers to maintain confidentiality as detailed in point no. 6 above, they should declare, in advance, if they are dealing with grant applications of a relative or family member (including but not limited to spouse, child, sibling, parent) or thesis/ post-doctoral mentor or stands to benefit financially if the applicant proposal is funded. In such cases, DST will allot the grant applications to the other program officer.

6. Sanction for violation

6.1 For a) Reviewers / Committee Members and b) Applicant

Any breach of the code of conduct will invite action as decided by the Committee.

6.2For Officers dealing with Program in DST

Any breach of the code of conduct will invite action under present provision of CCS (conduct Rules), 1964.

7. Final Appellate authority:

Secretary, DST shall be the appellate authority in issues pertaining to conflict of interest and issues concerning the decision making process. The decision of Secretary, DST in these issues shall be final and binding.

8. Declaration

I have read the above "Policy on Conflict of Interest" of the DST applicable to the ~~Reviewer/ Committee Member/~~ Applicant/ ~~DST Scheme or Program Officer~~[#] and agree to abide by provisions thereof.

I hereby declare that I have no conflict of interest of any form pertaining to the proposed grant*

I hereby declare that I have conflict of interest of any form pertaining to the proposed grant*

* & # (Tick whichever is applicable)

Name of the Applicant
(Strike out whichever is not applicable)

(**Signature with date**)

CERTIFICATE FROM THE INVESTIGATOR

Project Title

1. I/We agree to abide by the terms and conditions of the R&D grant.
2. I/We did not submit the same project proposal elsewhere for financial support.
3. I/We have explored and ensured that equipment and basic facilities (enumerated in the proposal) will actually be available as and when required for the purpose of the projects. I/We shall not request financial support under this project, for procurement of these items.
4. I/We undertake that spare time on permanent equipment (listed in the proposal) will be made available to other users.
5. I/We have enclosed the Endorsement from the Head of Institution.

Name and Signature of Investigator

Date……..

Place…….

ENDORSEMENT FROM THE HEAD OF THE INSTITUTION

(To be given on Letter Head)

Project Title:

1. Certified that the Institute welcomes the participation of Shri/Smt……. as the Principal Investigator and Shri/Smt…….as the other investigator (s) for the project and that in the unforeseen event of discontinuance by the Principal Investigator, the other investigator (s) will assume the responsibility of the fruitful completion of the project.

2. Certified that the equipment and other basic facilities as enumerated in Section II – Part B and such other administrative facilities as per terms and conditions of the grant, will be extended to the investigator (s) throughout the duration of the project.

Name and signature of the
Head of the Institution

Date:
Place:

PROJECT SUMMARY

(Not more than 1 and half page)

Project Title:

Name of Prototype/Device proposed to develop with TRL level:

Use of proposed device and Potential User (One line):

PI Name: **Age:**

Contact No. Mobile & Office:

Email ID:

Co- PI's:

Total Cost:

Duration:

Manpower:

Equipment proposed:

Industry Partner (if any):

Industry' financial Contribution (if any):

Objectives:

Methodology (in brief 150 words):

Deliverables:

Budget Details:

Sr. No.	Items	Budget(in Lakhs)			
		1st Year	2nd Year	3rd Year	Total
1.	Equipment's				
2.	Salaries/ Fellowships (Name & No.)				
3.	Consumables				
4.	Travel				
5.	Contingencies				
6.	Overhead Expenses*				
	Total				

Any other relevant information including Novelty /Details of Proof of Concept/Prototype developed by Investigator/Team:- (maximum 150 words):-

FORMAT FOR SUBMISSION OF PROJECT PROPOSALS

PART – A

1. **PROJECT TITLE:**

2. **BROAD AREA:**
(Tick the concerned area of the project)

a) **New material development** ( )

b) **Hydrogen production** ( )

c) **Hydrogen transport** ( )

d) **Hydrogen utilization & refueling** ( )

f) **Other area (Please specify)** ( )

3. **TOTAL COST OF THE PROJECT:**

4. **PROJECT DURATION :**

5. **INSTITUTION / ORGANIZATION:**

6. **OTHER PARTICIPATING / INTERACTINGAGENCIES:**
(Please enclose their letter regarding their willingness to participate in the project)

7. **PRINCIPALINVESTIGATOR:**

Name:

Designation :

Institution :

Address :

Email:

Mobile:

8. OTHER INVESTIGATOR(S)

i. Name :

Designation:

Institution:

Address:

Email:

Mobile:

ii. Name :

Designation:

Institution:

Address:

Email:

Mobile:

9. NAME, ADDRESS, EMAIL ID AND MOBILE NUMBER OF EXPERTS WORKING IN THE SUBJECT/AREA(S): (UPTO10)

10. NAMES AND ADDRESSES OF PERSONS/INSTITUIONS (UPTO 10) INTERSESTED IN THE OUTCOME OF THE PROJECT:

PART – B

1. **OBJECTIVES OF THE PROJECT:**

2. **APPLICATIONS OF THE MATERIAL/ PROTOTYPE/ DEVICE TO BE TAKEN UP FOR DEVELOPMENT.**

3. **USERS / USERS AGENCIES:**

4. **ESTIMATED REQUIREMENT (NO. OF PIECE / KG PER YEAR) OF THE PROPOSED MATERIAL/ PROTOTYPE/ DEVICE:**
   (Please mention how the estimated requirement is worked out, i.e. through interaction with users; market survey etc.)

5. **ESTIMATED COST OF THE MATERIAL/ PROTOTYPE/ DEVICE AFTER DEVELOPMENT:**
   (Please indicate the cost of the components required for making one unit and indicate estimated cost at which device will be available to users after development).

6. **THE COST OF SIMILAR IMPORTED MATERIAL/ PROTOTYPE/ DEVICE:**

7. **PRODUCTION AGENCY / INDUSTRY:**
   (Please see page 3 of General Information. Please annex willingness/commitment from the production agency to undertake production of material/prototype/device after development and commitment for their contribution for the project).

8. **REVIEW OF STATUS AND TECHNOLOGY TRENDS IN RESPECT OF MATERIAL/PROTOTYPE/DEVICE TO BE TAKEN UP FOR DEVELOPMENT:**

   a) International status of development.

   b) Current status in our country.

   c) Status in your organization/Review of expertise available with proposed investigating group in the subject of the project.

   d) Gaps to be covered through proposed work with special reference to the proposal.

9. **TECHNICAL DETAILS:**

   a) Features of the materials/prototype/device proposed to be taken up for development.

   b) Specifications.

c) Please make a comparison of the materials/prototype/device taken up for development with similar products if available in international market indicating similarities of differences.

d) Description of various techniques and reasons for choosing the particular technique of measurement.

e) Principle or operation.

f) Engineering Design of device/material processing/modeling

g) Block/schematic/diagram.

h) Description of various sub-systems etc.

i) How characterization, calibration, standardization, testing etc. will be achieved?
(Please describe in brief procedures/methods for these).
(Please give references wherever applicable).

10. WORKPLAN:

a) Methodology:

Please describe how the work (various steps/activities involved) will be carried out including linkages with production agency & users. How the materials/prototype/device is developed successfully and transferred to the production agency (s)?

b) Time schedule of activities:

Please give bar chart indicating important activities and time duration from start to end:

11. FACILITIES AVAILABLE AT YOUR ORGANISATION WHICH ARE RELEVANT / USEFUL IN IMPLEMENTING THE PROJECT AND WILL BE AVAILABLE TO YOU DURING THE IMPLEMENTATION OF THE PROJECT:

A. Infrastructural facilities (Tick the appropriate box)

Item	Yes	No	NR*	Item	Yes	No	NR*
a) Workshop				g)Transportation			
b) Water & Electricity				h) Administrative &Secretarial support			
c) Standby power supply				i) Library facilities			
d) Laboratory Space & Furniture				j) Computational facilities			
e) Air Conditioned room for equipment				k) Any other (Please mention)			
f) Telecommunication							

* NR : Not Required.

B. Available equipment (including test & measuring, calibration etc.) and accessories relevant to the project:

S.No.	Name of equipment and accessories	Model and Make	Remarks
1.			
2.			
3.			

NOTE: Please make sure that the aforesaid facilities and equipment will be available for the project.

C. Available manpower

S. No.	Name & Designation	Area of specialization
1.		
2.		
3.		

12. A. BUDGET ESTIMATES:

Sr. No.	Items	Budget			
		1st Year	2nd Year	3rd Year	Total
1.	Equipment				
2.	Salaries / Wages				
3.	Consumables				
4.	Travel				
5.	Contingencies				
6.	Overhead expenses*				
	Total				

* For the organization of the PI towards meeting their costs for overhead expenses on the project including infra-structural facilities etc.

12. B. BUDGET FOR SALARY /WAGES:

(As per OM. No. SR/S9/Z-08/2018 dated 30.01.2019 and SR/S9/Z-05/2019 dated 21.08.2019)

Sr. No.	Designation	Scale of pay	Monthly emoluments	Number	1st Year	2nd Year	3rd Year	Total

Justification for manpower required

12.C BUDGET FOREQUIPMENT:

Sr. No.	**Equipment / Accessories**	**Make & Model**	**Imported / Indigenous**	**Estimated Cost**	**F.E. Component**
TOTAL					

Justification for equipment proposed

12.D BUDGET FOR CONSUMABLESMATERALS:

(In Lakhs)

Sr. No.	Items	Quality	Budget			
			1st Yr	2nd Yr	3rd Yr	TOTAL

Justification for consumable materials giving estimated requirement of consumable for each prototype.

12. E BUDGET FOR TRAVEL:

Please provide estimated number of visits related to the project work and cost per visit along with justification.

13. Research projects with the investigator(s):

Please give the following details for each project: -

Sr. No.	Project Title	Duration	Date of commencement/ Completion	Status (Ongoing/ Completed)	Total Cost	Funding agency

14. Industrial R&D Project experience/ Industrial Collaborations details.

BIODATA OF PI/ Co-PIs: -

a) Name
b) Date of Birth
c) Academic qualifications
d) Areas of expertise
e) Experience

Sr. No.	Position held (Designation)	Place of work	Duration	Areas of work

f) Awards received, if any
g) Publications (Nos.)
- Books
- Research papers
- Patents

h) List of publications (Paper published during last 10years)
i) List of project completed indicating briefly title, sponsoring agency, duration and outcome of project.
j) Details of materials/prototype/device already developed in past.